



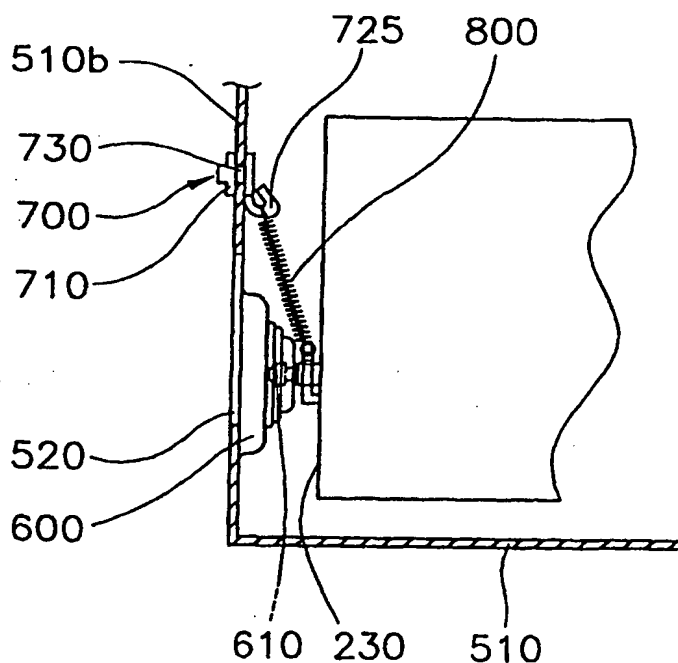
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: ANTI VIBRATION DEVICE FOR CD CHANGER

## (57) Abstract

An anti vibration device for a compact disk changer which has a spring mounted between a chassis frame and a cover is disclosed. The direction of the spring can be changed by a movable member fixing one end of the spring. The member moves along an arc shaped slot formed in the cover. The slot has grooves for temporarily fixing the member by the elastic force of the spring. The device also has a damper for reducing relative movement of the cover and the chassis frame.



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## ANTI VIBRATION DEVICE FOR CD CHANGER

### DESCRIPTION

#### TECHNICAL FIELD OF THE INVENTION

The present invention generally relates to an anti vibration device for a compact disk (CD) changer, and more particularly, to a vibration-absorbing device for the CD changer, which can be controlled without any tool such as a screw driver in order to adjust in accordance with the mounting direction of the CD changer.

#### BACKGROUND ART

The CD changer has a magazine accommodating a plurality of disks, such as compact disks, a tray transferring mechanism for drawing a predetermined tray out of the magazine, and a turntable for playback of a disk.

Fig. 1 shows a conventional CD changer 100, which has a magazine part 110 having a magazine 150, a turntable part 120, a chassis frame 130, a cover 199, and an anti vibration panel 162 having an anti vibration device 160. The anti vibration device 160 will be explained in detail with reference to Fig. 2.

Fig. 2 shows the anti vibration device 160 which has a damper 170 and a spring 190, which are mounted between the chassis frame 130 and the anti vibration panel 162. The damper 170 is secured to a side wall of the chassis frame 130 and a shaft 174 protruds from the panel 162 toward the chassis frame 130. An end of the spring 190 is fixed to the side wall of the chassis frame 130 and the other end of the spring 190 is fixed to a protrusion 182 on a rotation lever 180.

The damper 170 and the spring 190 reduce the vibration transferred from the anti vibration panel 162 to the chassis frame 130. The rotation lever 180 can rotate about its axis along the mounting direction of the CD changer.

Fig. 3 shows the shape and operation of the rotation lever 180. An arc shaped slot 164 is formed on the panel 162, and the protrusion 182 (see Fig. 2) penetrates the slot 164 and rotates along the slot 164. Also three screw holes 163 are formed on the panel 162 for fixing the rotation lever 180 in a predetermined position. Each of the screw holes 163 is positioned at 0 degree, 45 degrees, and 90 degrees from the horizontal direction. If the vibration of horizontal direction is

much bigger than that of other directions, the rotation lever 180 is preferably fixed at 0 degree position. And if the vibration of the vertical direction is much bigger than that of the other directions, the rotation lever 180 is preferably fixed at 90 degrees position. In this case, the vibration direction is determined in accordance with the mounting direction of the CD changer.

However, the fixing and releasing operation of the rotation lever 180 should be done by a tool such as a screw driver, which is inconvenient for a user.

### DISCLOSURE OF THE INVENTION

Therefore, it is an object of the present invention to provide an anti vibration device for a compact disk changer, which can be controlled without any tool such as a screw driver in order to adjust in accordance with the mounting direction of the CD changer.

To achieve the object, the present invention provides an anti vibration device for a compact disk changer mounted on a chassis frame, comprising a cover for protecting the compact disk changer; a first means for elastically supporting the chassis frame to the cover; and a second means for controlling supporting direction of the first means, wherein position of the second means is maintained by elastic force of the first means.

The chassis frame has a side wall, and the first means is a spring, which has one end fixed to the side wall of the chassis frame and the other end fixed to the second means.

Preferably, a bracket is formed on the side wall of the chassis frame and the spring is fixed to the bracket.

The cover has a side panel where an arc shaped slot is formed, and the second means moves along the arc shaped slot. The arc of the arc shaped slot is at least 90 degrees about an imaginary center thereof.

Preferably, the arc shaped slot has at least two grooves for fixing the second means. The second means has a knob portion, a hook, and a bar connecting the knob portion and the hook where the other end of the spring is fixed. The bar penetrates the arc shaped slot and is fixed in the groove of the arc shaped slot.

The device of the invention, further comprises a damper for reducing

relative movement of the cover and the chassis frame. The damper is mounted on a shaft of the chassis frame.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

A more complete appreciation of this invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

Fig. 1 is a perspective view showing a conventional CD changer;

Fig. 2 is a sectional partial view showing an anti vibration device of Fig. 1;

Fig. 3 is a side view of Fig. 1 and shows the anti vibration device;

Fig. 4 is a perspective view showing a CD changer according to an embodiment of the present invention;

Fig. 5 is a sectional partial view showing an anti vibration device of the CD changer of Fig. 4; and

Fig. 6 is a side view of Fig. 5 and shows an operation of the anti vibration device of Fig. 5.

### **MODES OF CARRYING OUT THE INVENTION**

Reference will now be made in detail to the preferred embodiment of the present invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

Fig. 4 shows a CD changer 200 having a magazine part 210 having a magazine 250, a turntable part 220, a chassis frame 230, a lower cover 510 and an anti vibration device 500 according to an embodiment of the present invention. The lower cover 510 has a bottom panel 510a and two side panels 510b, each of which has two arc shaped openings 520.

Referring to Fig. 5, the anti vibration device 500 is mounted between the side panel 510b and the chassis frame 230. The anti vibration device 500 has two dampers 600 and a spring 800, though in Fig. 5 only one damper 600 is shown.

To mount the damper 600, there is formed a shaft 610 extended from the side wall of the chassis frame 230 toward the side panel 510b of the lower cover 510. The damper 600 is inserted through the opening 520 and is mounted on the shaft 610 of the chassis frame 230. Since there are two openings 520 in the side panel 510b of the lower cover 510 in this embodiment, two dampers 600 can be mounted on each side of the chassis frame 230.

To mount the spring 800, there is also formed a bracket 540 on the side wall of the chassis frame 230 and a direction control member 700 having a hook 725 is mounted on the side panel 510b of the lower cover 510. The direction control member 700 also has a knob 710 and a bar 730 connecting the knob 710 and the hook 725. The bar 730 penetrates the side panel 510b of the lower cover 510, the knob 710 of the member 700 lies outside of the side panel 510b of the lower cover 510 and the hook 725 lies inside of the side panel 510b of the lower cover 510. One end of the spring 800 is fixed to the hook 725 of the member 700 and the other end of the spring 800 is fixed to the bracket 540 of the chassis frame 230.

Referring to FIG. 6, the movement of the direction control member 700 will be hereafter explained.

The direction control member 700 is mounted through an arc shaped slot 530, the arc of which is at least 90 degrees. To fix the mounting position of the member 700, there are formed five grooves 535 in the slot 530, the lowest one of which is in the horizontal relation with the end of the spring 800 fixed to the bracket 540 of the chassis frame 230. The others are positioned at 22.5, 45, 67.5, and 90 degrees about the fixed end of the spring 800. The bar 730 of the member 700 (see Fig. 5) is fixed on each of the grooves 535 by the force of the spring 800, and the diameter of the bar 730 is smaller than the width of the slot 530 to be moved along the slot 530. In the slot 530 below the lowest one among the grooves 535, there is an opening portion 536 for mounting the member 700.

According to this invention, the anti vibration device 500 can effectively absorb the vibration in any directions by shifting the direction control member 700. Conveniently, the direction control member 700 can be shifted to the proper position without any machine tool, such as a screw driver.

In the above embodiments, although five grooves are formed in the slot, the number of the grooves is not limited in this invention as far as the grooves are used for fixing the direction control member.

In addition, the number of the damper and the shape of the hook are not  
5 limited in this invention.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within  
10 the spirit and scope of the appended claims.

**WHAT IS CLAIMED IS:**

1. An anti vibration device for a compact disk changer mounted on a chassis frame having a side wall, said anti vibration device comprising:

a cover for protecting said compact disk changer;

5 a first means for elastically supporting the chassis frame to said cover; and  
a second means for controlling supporting direction of said first means,  
wherein said second means is positioned by an elastic force of said first means.

2. The device of claim 1, wherein said first means is a spring, a first end of which is fixed to the side wall of the chassis frame and a second end thereof is fixed  
10 to said second means.

3. The device of claim 2, further comprising a bracket mounted on the side wall of the chassis frame and the first end of the spring is fixed to the bracket.

4. The device of claim 3, wherein said cover has two side panels, each of which has an arc shaped slot to lead said second means to move therein.

15 5. The device of claim 4, wherein the arc of the slot is at least 90 degrees about an imaginary center thereof.

6. The device of claim 5, wherein the imaginary center of the slot is the first end of the spring fixed to the bracket of the chassis frame.

20 7. The device of claim 5, wherein the slot has at least two grooves for fixing said second means.

8. The device of claim 5, wherein the slot has five grooves.

9. The device of claim 4, wherein said second means has a knob portion, a hook, and a bar connecting the knob portion and the hook where the second end of the spring is fixed, and the bar penetrates the arc shaped slot.

25 10. The device of claim 7, wherein said second means has a knob portion, a hook, and a bar connecting the knob portion and the hook where the second end of the spring is fixed, and the bar is fixed in the groove of the slot.

11. The device of claim 1, further comprising a damper for reducing a relative movement of said cover and the chassis frame.

30 12. The device of claim 11, wherein the chassis frame has a shaft protruded therefrom toward said cover, and said damper is mounted on the shaft of the chassis

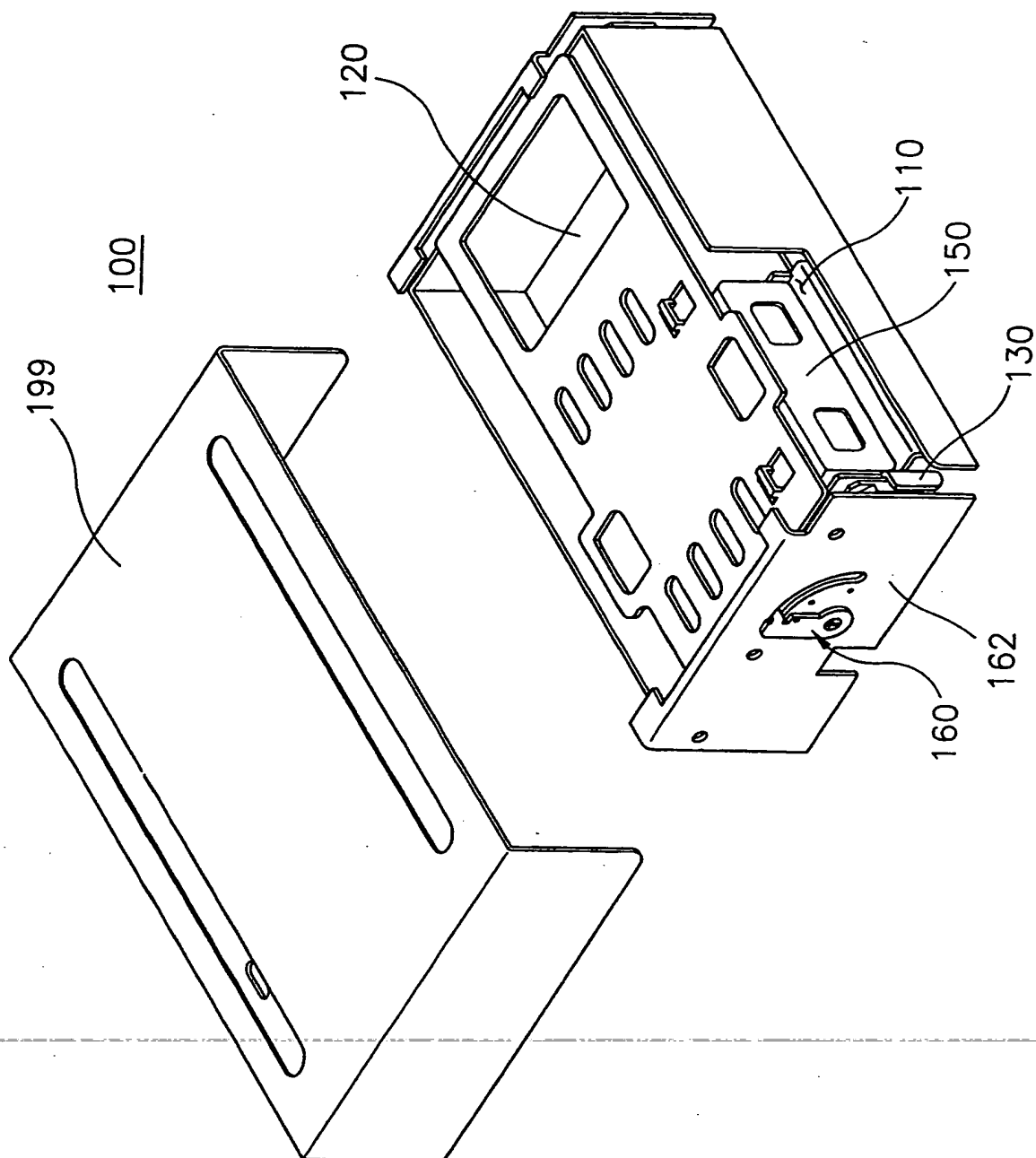


frame.

13. The device of claim 12, wherein the cover has a side panel where an opening is formed, and said damper is inserted through the opening .

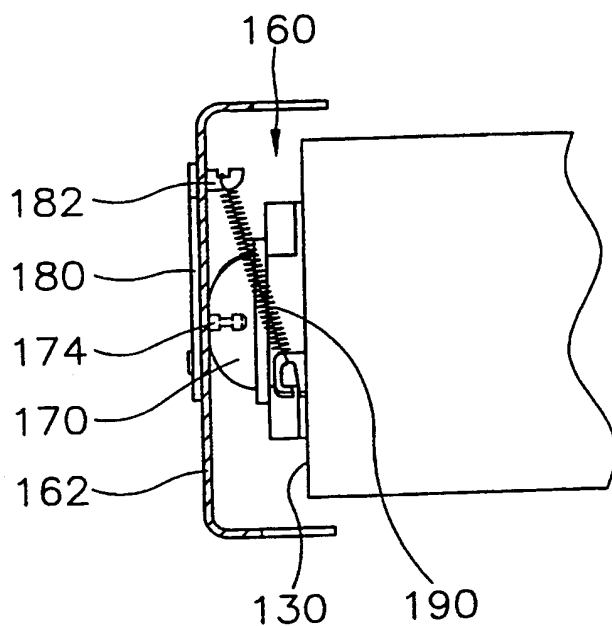
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**FIG. 1 (PRIOR ART)**

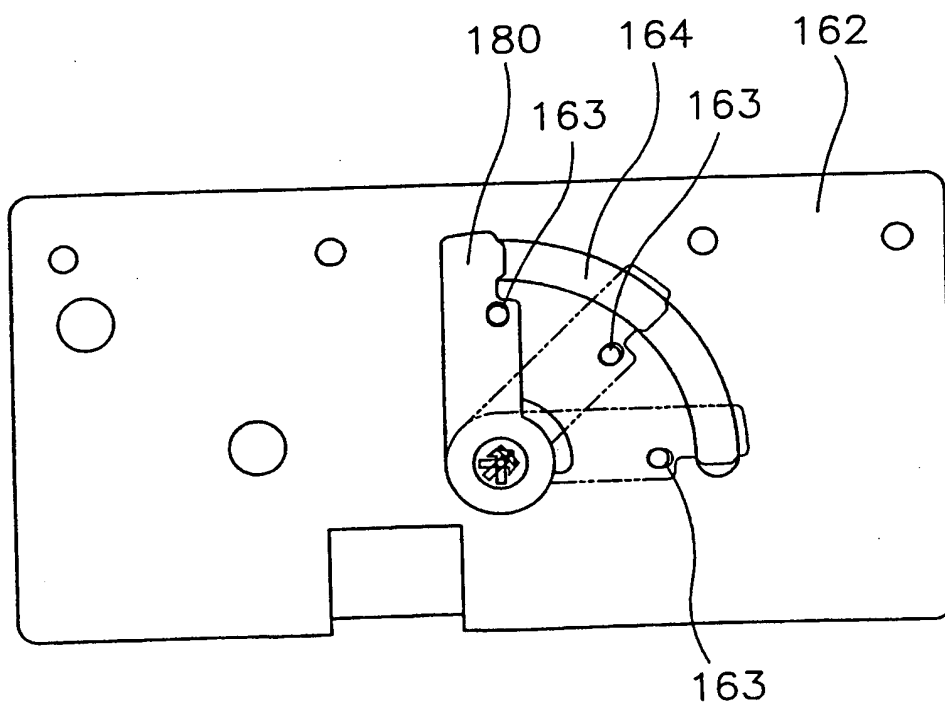


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**FIG. 2 (PRIOR ART)**

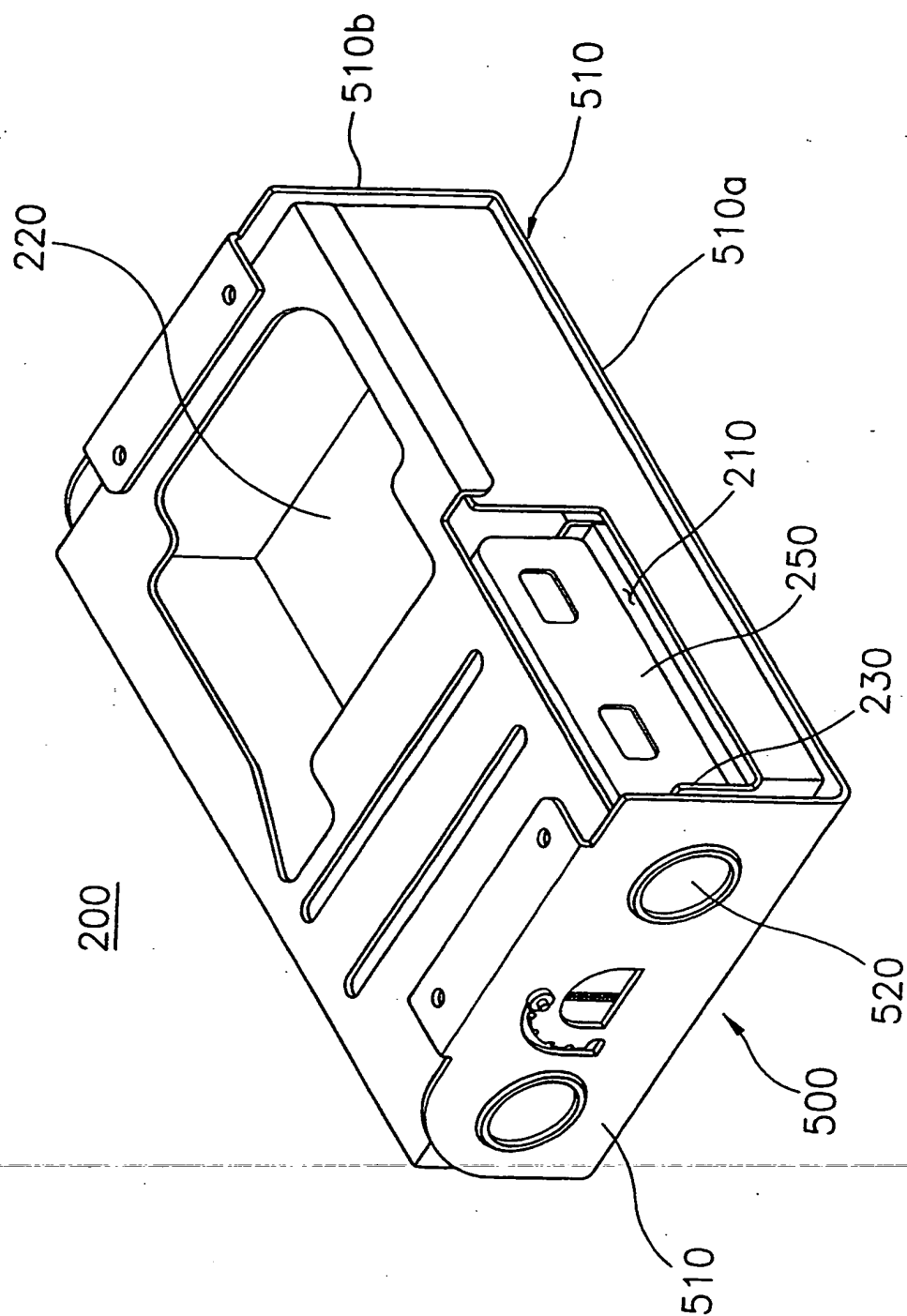


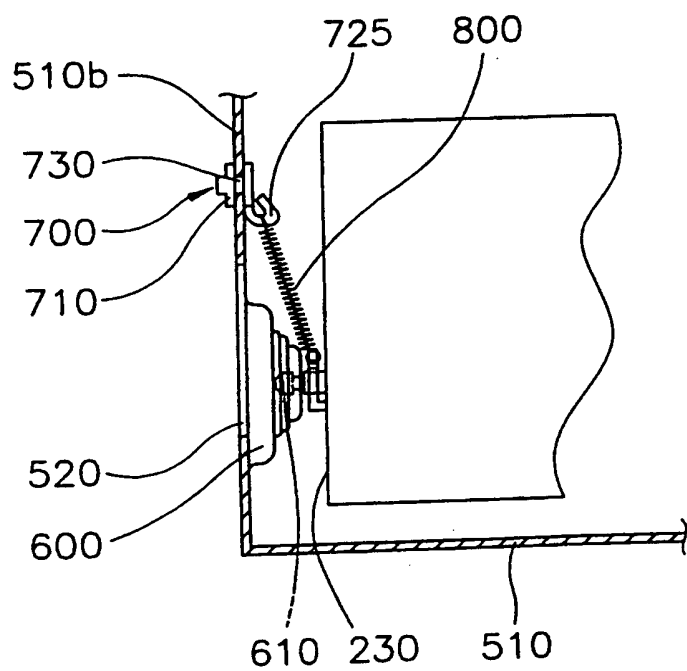
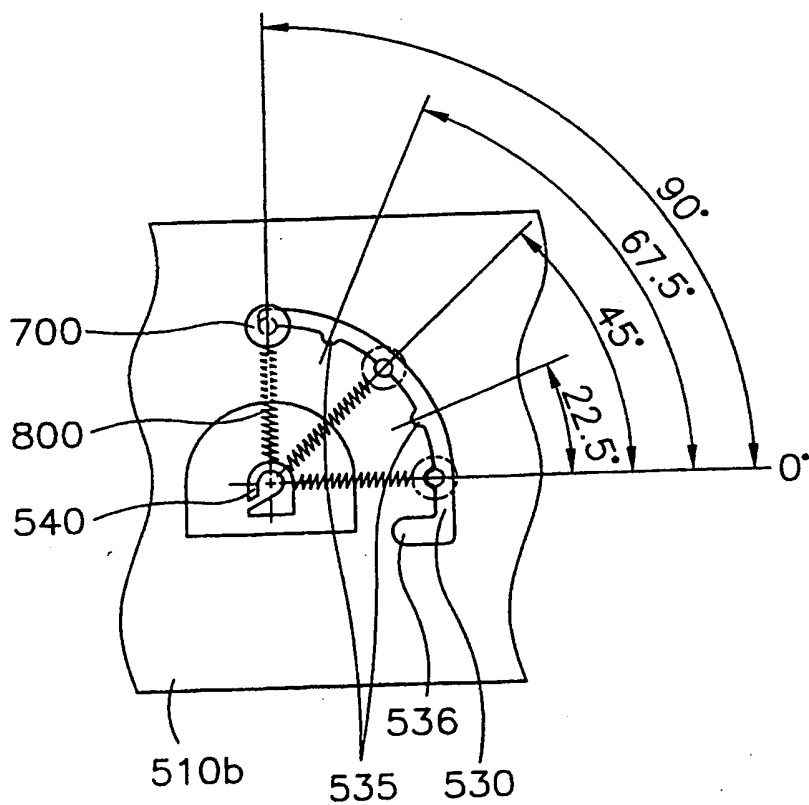
**FIG. 3 (PRIOR ART)**



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**FIG. 4**



**FIG. 5****FIG. 6**

## CLASSIFICATION OF SUBJECT MATTER

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ording to International Patent Classification (IPC) or to both national classification and IPC

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1

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 09-226 473 A (EKUSHINGU K.K.), 30 January 1998 (30.01.98), abstract In: Patent Abstracts of Japan [CD-ROM].	1-13
A	WO 98/11 362 A2 (ROBERT BOSCH GMBH), 19 March 1998 (19.03.98), abstract; fig.1-8; claim 1; page 4, line 17 - page 6, line 31.	1-13
A	WO 90/13 895 A1 (DEUTSCHE THOMSON-BRANDT GMBH), 15 November 1990 (15.11.90), abstract; fig.8-13; claim 1.	1-13
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Further documents are listed in the continuation of Box C.

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